



Evaluation of the Effectiveness of Polyoxidonium in the Treatment of Patients with Sinusitis with Benign Neoplasms of the Nose and Paranasal Sinuses

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Abstract: The paper presents the results of a study of endogenous intoxication in 68 patients with sinusitis with benign neoplasms of the nose and paranasal sinuses. Endogenous intoxication in this pathology is due to the accumulation of medium molecules in the plasma, activation of lipid peroxidation and a decrease in antioxidant protection. Polyoxidonium showed pronounced detoxification, antioxidant actions with correction of endotoxemia indicators to control values.

Key words: sinusitis, benign neoplasm, endotoxemia, lipid peroxidation, polyoxidonium.

Introduction: The proportion of sinusitis in benign neoplasms of the nose (NN) and paranasal sinuses (PNS) has a clear upward trend and is 5-20% in the structure of ENT diseases, and in the general population - 1-4% [5.11; 7.154]. The considered pathology reduces the quality of life of patients due to deterioration or complete blockade of nasal breathing, impaired sense of smell, headache and chronic hypoxia. Many etiological factors, their relationship and role in the pathogenesis of benign NN and PNS are not yet clear, and the existing information on etiopathogenesis and treatment methods is contradictory, which makes it difficult to interpret the data obtained [9,815]. The accumulated material indicates immune and biochemical disorders in patients with sinusitis with benign NN and PNS [1,40; 3.298]. Despite the improvement of surgical techniques and a wide range of drugs used, the frequency of exacerbations of chronic sinusitis and recurrence of benign neoplasms ranges from 5 to 60% [3,299]. Therefore, in terms of studying the pathogenesis and developing evidence-based methods of treatment and their optimization, sinusitis in benign NN and PNS is an urgent problem of modern otorhinolaryngology [9,815; 10,1].

In previous works [7,154], we have shown the immunomodulatory effect of polyoxidonium on the immune system of patients with sinusitis with benign NN and PNS. Based on the foregoing, the aim of this work is to evaluate the antioxidant effectiveness of polyoxidonium in the treatment of patients with sinusitis with benign NN and PNS.

Materials and research methods. 68 patients with sinusitis with benign NN and PNS and 20 practically healthy people aged 11-65 years were examined.

To assess endogenous intoxication caused as a result of disruption of lipid peroxidation (LPO) processes, the following biochemical indicators were used: the content of the secondary product of LPO - malondialdehyde (MDA), the activity of the antioxidant enzyme catalase (CA), the content of medium-weight molecules (MMM₂₈₀, MMM₂₅₄), the MDA/CA ratio is a measure of the LPO shift to the prooxidant or antioxidant side, and MMM₂₈₀/MMM₂₅₄ is the protein stability coefficient (PSC), a decrease in which indicates the transformation of the protein into a more degraded form. An integral indicator of endogenous intoxication is the level of MMM, which has two funds: the first fund of MMM containing aromatic amino acids and having an absorption maximum at 280 nm; the second pool of MMM containing no aromatic amino acids and having an absorption maximum at 254 nm.

In venous blood plasma, markers of endogenous intoxication, MMM₂₈₀ and MMM₂₅₄, were determined according to the method of N.I. Gabrielyan [2,18], MDA according to the method of S.G. Konyukhova [4, 33], CA according to the method of M.A. Korolyuk et al. [2.18; 6.13]. The ratio of MDA/CA and PSC was calculated.

Statistical processing of the obtained data was carried out using the Student's coefficient at $P > 0.95$.

Results and discussions. The results obtained characterizing the manifestations of endogenous intoxication in patients with sinusitis with benign NN and PNS before treatment are shown in Table 1.

Table 1

Indicators of endogenous intoxication in patients with sinusitis with benign NN and PNS before treatment

Indicators	Control, n =20	Before treatment, n = 68	P<
MDA, $\mu\text{mol/l}$	$3,50 \pm 0,23$	$6,56 \pm 0,28$	0,001
CA, mkat/sec l	$0,90 \pm 0,06$	$0,28 \pm 0,03$	0,001
MMM254, c.u.	$0,24 \pm 0,03$	$0,51 \pm 0,04$	0,001
MMM280, c.u.	$0,28 \pm 0,03$	$0,451 \pm 0,041$	0,001
PSC, c.u.	$1,16 \pm 0,07$	$0,88 \pm 0,06$	0,001
MDA/CA, c.u.	$3,89 \pm 0,16$	$23,43 \pm 1,38$	0,001

P - significance of differences relative to control

The content of MDA increased by 87.4% against the background of a decrease in CA by 68.9%. The ratio of MDA/CA in patients compared with the control group increased by 6 times, indicating a significant activation of free radical oxidation in patients with sinusitis with benign NN and PNS. There was also an accumulation of MMM in the blood plasma: the content of MMM₂₅₄ increased by 112.5%, and MMM₂₈₀ by 60.7% relative to the control. At the same time, the PSC was 75.9%.

Thus, in patients with sinusitis with benign NN and PNS, the development of endogenous intoxication is multifactorial - against the background of activation of free radical oxidation, hydrophilic markers of endotoxiosis, MMM, accumulate in the plasma, which is also associated with disorders in the immune status, leading to the development of neoplasms. The foregoing dictates the need to include in the treatment complex a drug that exhibits immunomodulating, detoxifying and antioxidant properties. Such a drug is polyoxidonium, the effect of which is due to the inhibition of lipid peroxidation reactions, an increase in the antioxidant status and a decrease in the plasma hydrophilic components of endotoxiosis [3.301; 5.12].

To assess the effectiveness of treatment, the examined patients were divided into 2 groups:

Group I, who received traditional therapy (TT) - 22 patients;

Group II, who received polyoxidonium against the background of traditional treatment - modified therapy (MT) - 15 patients.

Traditional treatment included: surgical removal of the neoplasm, antibacterial, anti-inflammatory, hyposensitizing and restorative therapy. Local treatment consisted of daily anemization of the nasal mucosa with vasoconstrictor drugs, if necessary, probing and puncture of the inflamed sinuses, followed by lavage, administered antiseptic and antibacterial drugs.

Against the background of traditional treatment, a moderate change in the indicators of endotoxiosis was observed. The results of indicators of endogenous intoxication after treatment are presented in table 2.

The content of MDA decreased by 28.04% relative to the figure before treatment and exceeded the norm by 32.5%. Against this background, catalase activity increased only by 7.14% and amounted to only 33.3% of the control value. The MDA/CA ratio decreased by only 32.86%, which is 4.04 times higher than the norm.

Table 2

Indicators of endogenous intoxication in patients with sinusitis with benign NN and PNS after treatment

Indicators	Before treatment, n=68	Treatment methods			
		TT, n=22	P<	MT, n=15	P<
MDA	6,56±0,28	4,72±0,32	0,05	3,76±0,12	0,1
CA	0,28±0,03	0,30±0,02	0,001	0,82±0,1	0,05
MMM ₂₅₄	0,51±0,04	0,44±0,03	0,001	0,28±0,02	0,05
MMM ₂₈₀	0,451±0,041	0,40±0,03	0,001	0,29±0,02	0,1
PSC	0,88±0,084	0,91±0,08	0,05	1,04±0,07	0,1
MDA/CA	23,43±1,38	15,73±0,72	0,001	4,59±0,20	0,1

P - reliability of differences relative to the control indicator

Traditional therapy contributed to a slight correction of the hydrophilic component of endotoxemia: the concentration of MMM_{254} decreased by 13.7% compared to before treatment and exceeded the norm by 83.3%; the level of MMM_{280} decreased by only 11.1%, exceeding the control value by 42.8%. PSC exceeded the value before treatment by 3.4%, accounting for 78.4% of the control value.

Thus, traditional therapy did not lead to the normalization of endotoxemia markers, which indicate the need for additional therapy for this pathology using a drug that has immunomodulatory, antioxidant and detoxification properties. We chose polyoxidonium as such a preparation.

Polyoxidonium was administered at a therapeutic dosage of 6 mg IM once a day for 5-10 days in the postoperative period, depending on the patient's condition.

Under the influence of polyoxidonium, the content of MDA decreased by 42.6%, and the deviation was 7.4% from the control ($P < 0.01$). The activity of plasma catalase against the background of polyoxidonium increased by 60.0%, approaching the boundaries of the control indicator ($P < 0.05$).

A significant antioxidant effect of the drug was indicated by a decrease in the MDA/CA ratio by 80.4%, a decrease in the concentration of MMM_{254} and MMM_{280} by 45.0 and 35.5%, respectively, which significantly brought it closer to the control values. Thus, the use of polyoxidonium contributed to the elimination of endogenous intoxication of the body with the restoration of LPO processes.

After the modified therapy, such clinical symptoms as headache (before treatment - 93.3%), discharge from the nose (before treatment - 86.6%), restoration of nasal breathing (before treatment - in 86.6% of patients, after treatment - 7.7%) and sense of smell (before treatment - in 66.6% of patients, after treatment - 7.7%). Improvement in the condition of patients correlates with the restoration of indicators of endogenous intoxication.

Thus, a modified therapy can be recommended in the treatment of patients with sinusitis with benign NN and PNS, since endogenous intoxication of the body is removed in a short period, lipid peroxidation processes are restored, and the condition of patients improves.

CONCLUSIONS

1. Sinusitis in benign NN and PNSs is accompanied by endogenous intoxication caused by the accumulation of MDA and MMM in the blood plasma, an increase in MDA/CA and a decrease in the activity of CA, PSC.

2. Polyoxidonium in the treatment of patients with sinusitis with benign NN and PNS showed pronounced detoxification, antioxidant effects with the correction of endotoxemia indicators to control values.

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